## 2.1 Properties of and Calculation Rules for Sets

First of all, we want to specify what we mean by a set. For this we use the definition of Georg Cantor (1845—1918). Cantor was a famous German mathematician and the founder of set theory.

grouping or collection ofSet By a set we mean every gathering M of certain Mwell-differentiated objects m of our view or Definition: Set

In plain English, a set is a our thinking (which are called the elements of ) into a whole.

distinct objects.

A set thus comprises objects that are clearly distinguishable from each other. We call these

mathematical constructs, such as the set of natural numbers ℕ. Sets are oftenm written in objects the elements of the set. At first, no statement is made about what kind of elements

capital letters, e.g., M, while lowercase letters are usually used for objects, e.g., . a set must contain. They can be real-world objects, such as a group of people, but also

To express that an object m is element of a set c} c ∈ Mm M containing the three elements M m ∉ MMa, , we write b, and c. It is therefore m ∈ M. To express that an∅a ∈ MM := {a, b,b ∈ M object is not element of a set , we write .

The empty set, i.e., the set that has no single element, is given the symbol . The elements of a set are noted within curly brackets, also known as braces. For example,

denotes a set , , and .

e. This fact can be noted as M = {m|m has the property e}e . In this case M would be the Often one wants to express additionally that the elements of a set have a certain property set of all elements having the property . The specification of such a property is optional.